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Original Article

Comparative Study of Outcome of Anterolateral Thigh free flap and Latissimus Dorsi Free Flap for Reconstruction of Soft Tissue Defect with Exposed Bone in Lower Limb

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Abstract

Background: *Anterolateral thigh (ALT) free flap and Latissimus Dorsi (LD) free flaps are two widely used and popular options for reconstruction of soft tissue defect in the lower extremity. In this study reconstructive outcome of soft tissue defect in lower extremity by these two free flaps were compared.*

Objective: *The study was designed to compare the outcome of ALT and LD free flap for reconstruction of soft tissue defect with exposed bone in lower limb.*

Methodology: *The study was conducted from 23rd October 2017 to 22nd October 2018, for the period of 12 (twelve) months in Department of Plastic and Reconstructive Surgery, Dhaka Medical College. A total number of 30 patients with soft tissue defect with exposed bone with or without fracture in lower limbs were included in this study. Among 30 patients, 15 of them reconstructed with ALT free flap and 15 of them reconstructed with LD free flap.*

Results: *This study revealed LD free flap had larger flap dimension (284.57 cm²) than ALT free flap (101.13cm²) and was used to cover larger soft tissue defect than ALT free flap. In addition it required shorter opeparating hours than ALT free flap and comparatively easy anastomotic procedure was required; single venous anastomosis would be adequate.*

On contrast ALT free flap had fewer flap related complications (4 cases; 26.6%) in compare to LD free flap (6 cases; 40%), better complete flap survival rate (11 cases 73.4%), longer pedicle length (10.30 ± 1.99 cm) and shorter hospital stay (6-20 days) than LD free flap(21-40 days) due to single stage surgery; consequently early mobilization and less economic burden for the patients and government made ALT free flap a better option for reconstruction of soft tissue defect in lower limb.

Conclusion: *ALT free flap is preferable for reconstruction of soft tissue defect with exposed bone to LD free flap in terms of complete survivality, adequate pedicle length and hospital stays except coverage of larger soft tissue defect, where LD free flap is a better option.*

Keyword: *Anterolateral Thigh(ALT) Free flap, Latissimus Dorsi(LD) free flap, Lower Extremity soft tissue defect*

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Introduction:

Sir Harold Gillies[1], the father of Plastic surgery often said "tissue transfer is a constant battle between blood supply and beauty". Still the success of tissue transfer primarily depends upon the stability of the vascular component.

The lower limb is always known for its poor wound healing and a scarce source of flaps for reconstruction[2]. The methods for reconstructing soft tissue defects of the lower extremities are direct closure, skin graft, local flaps, cross-leg flap and free flaps[3]. Skin graft requires a vascular bed and fails to take over exposed bone without periostium, cartilages without pericondrium or tendons without paratenon. The local flaps

are good options for soft tissue coverage in lower limb but insufficient tissue following trauma often limits its availability. The cross leg flap restricts the movements of the joints, makes it difficult for the patients to maintain the position of the leg, prolong hospital stay and also requires a second surgery for flap division.[4] Muscle flaps such as gastrocnemius, soleus and tibialis anterior muscles can be used with skin grafts in the proximal and middle thirds of a pretibial defect[5].

Often Limbs are so badly traumatized that there is paucity of the tissue for reconstruction of the defect. Hence the advent of microsurgery opened a new dimension to lower extremity reconstruction.

In 1984 Song and his colleagues first described anterolateral thigh (ALT) free flap, a fasciocutaneous flap usually based on the septocutaneous perforators of the descending branch of the lateral circumflex femoral artery and its venae comitantes.[6]

Koshima et al.,1989[7] study noted that ALT free flap was not viable in 5 out of 13 cases because of absent septocutaneous vessels thus it gains a reputation of being unpredictable and unsafe. But with the development of improved perforator flap dissection technique, ALT free flap regained its popularity.[8-9]

In 2007 Chow SW et al., 2007[10] study after dissecting 38 Korean cadavers showed that ALT flap has septocutaneous (17.5%) perforator and musculocutaneous (82.5%) perforator. He proved that ALT has a reliable vascular anatomy despite some anatomical variability with a long vascular pedicle with large diameter vessels.

Wei et al.,2002[11] and Lutz BS et al., 2005[12] study proved that ALT is a ideal soft tissue flap. it is pliable and can be thinned to a significant degree without compromising its blood supply[13].

In 1981 Mathes and Nahai classified Latissimus Dorsi as a type V muscle flap with one dominant vascular pedicle from the thoracodorsal artery[14]. Its advantages are well documented and include a reliable anatomy, potential for coverage of large defects, adequate pedicle length, good sized vessels and minimal donor site morbidity[15].

The flap was originally defined and performed by Tansini as a refinement of his original back up flap for breast reconstruction [16] He incorporated the Latissimus Dorsi muscle because he observed the contribution of the thoracodorsal vascular pedicle to the blood supply of the back skin. Tansini's method was mentioned in the literature by D'Este and Purpura[17,18].

The LD musculocutancous flap was reinvented for reconstructive surgery in the 1970s by Olivari, who used it to cover a large radiation ulcer of the chest wall[19].

Bostwick was the first to describe the Latissimus Dorsi musculocutaneous lap for breast reconstruction in English medical literature [20] and in 1978, Maxwell was the first Plastic Surgeon who described the use of the Latissimus Dorsi as a free flap based on thoracodorsal artery[21].

The bulkiness of the flap was considered a major drawback for certain clinical problems. This problem was solved by diminishing the muscle volume (tailoring the distal end with a fasciocutaneous extension) or by dividing the muscle along its intramuscular pedicle. [22, 23]

Kim J T et al performed 334 procedures involving the Latissimus Dorsi (LD) flap concluded that this flap has the potential to be used as widely as, or in preference to the anterolateral thigh flap[24].

This study was done to compare the outcome of ALT free flap and LD free flap for various soft tissue defect in lower limb. In this study viability, adequacy of wound coverage, complications and donor site morbidity of ALT and LD flap was compared.

Material and Method

Study was designed as a prospective, observational study..The study was conducted in the Department of Plastic and Reconstructive Surgery, Dhaka Medical College from 23 October 2017 to 22 October 2018, for the period of 12 (twelve) months. A total number of 30 patients with soft tissue defect with exposed bone with or without fracture in lower limbs are included in this study. Among 30 patients, 15 of them reconstructed with ALT free flap and 15 of them reconstructed with LD free flap.

In this study age, sex, etiology, wound size prior and after excision, location of the wound, flap length, flap width, dimension, time of anastomosis, duration of surgery, donor site closure, flap survivality, adequate durable coverage, donor site morbidity and presence of post operative infection was compared between ALT and LD free flap.

Operative Technique:

ALT fee flap: Perforators were identified by a straight line drawn from the anterior superior iliac spine to the lateral border of the patella. A circle with a radius of 3 cm is drawn at the midpoint of this line usually perforators are located within this circle.

Fig.-1.3: *Design and marking for ALT free flap*

Flap was harvested by a medial incision made along its medial border of the designed flap through the skin and subcutaneous tissue, down to the level of the fascia of the thigh. At first the rectus femoris and vastus lateralis is identified. If Perforator was septo-cutaneous, the vessels to the skin can be seen at this level, the dissection is straightforward and uncomplicated and perforator is dissected upto its origin from descending branch of lateral circumflex femoral vessels or further until an adequate length is obtained.

Fig.-1.4: *Between Vastus Lateralis and Rectus Femoris*

In case of musculocutaneous perforator then intramascular dissections is performed in a retrograde fashion and trace it back through the anterior part of vastus lateralis to its origin from the descending branch of the lateral femoral circumflex artery. Vastus lateralis muscle can be taken along with the perforator.

Lateral Cutaneous nerve of the thigh will be encountered in the subcutaneous fat in its distal course at the anterosuperior edge of the flap. If a sensate (neurosensory) flap is desired, it may be included in the elevation.[34]

LD Flap harvest:

Positioning and draping:

The classic way to position a patient is to expose the full back of the patient by placing the patient in a lateral decubitus position. Expose the back up to the spinous processes. Patient's shoulder should be abducted to facilitate axillary dissection. The orientation of skin pedicle is typically transverse or oblique. In case of female transverse incision along the line of bra is preferable.

Fig.-1.6: *Design and marking of LD free flap*

Skin paddle is dissected up to the muscular plane. Same incision was used to elevate skin flap but extended to axilla as required and extended inferiorly. Anterior edge of the Latissimus Dorsi was identified by the posterior axillary fold. The skin and subcutaneous tissue was incised until the anterior edge of the Latissimus Dorsi muscle is identified. Latissimus Dorsi muscle is then dissected off from the thoracic wall using diathermy and blunt finger dissection .Superiorly this dissection plane consists of loose areolar tissue which makes it easy to strip the Latissimus Dorsi from the underlying tissues. Antero inferiorly it attaches to the abdominal wall muscle and intersperses with serratus anterior and external oblique muscle fibers and is dissected. Inferiorly it is dissected from its insertion from iliac crest.

Medially it is dissected from its insertion from spinous processes and thoracolumbar fascia. Adequate hemostasis should be ensured as spinous perforators are encountered and in the upper part of the medial aspect of the muscle may be obscured by the inferior aspect of trapezius muscle.

Superiorly this edge can be a little tedious to identify where the Latissimus Dorsi intersperses with the fibers of teres major.

Dissection of the pedicle:
Muscle was elevated and pedicle was identified by following the descending branch to status anterior. Serratus branch was used as a guide to detect the pedicle which was prepared up to the circumflex scapular vessels. Pedicles may include artery up to axillary artery.

Microvascular anastomosis was a critical step for a successful free-tissue transfer and anastomosis was performed preferably under a microscope or loupe.

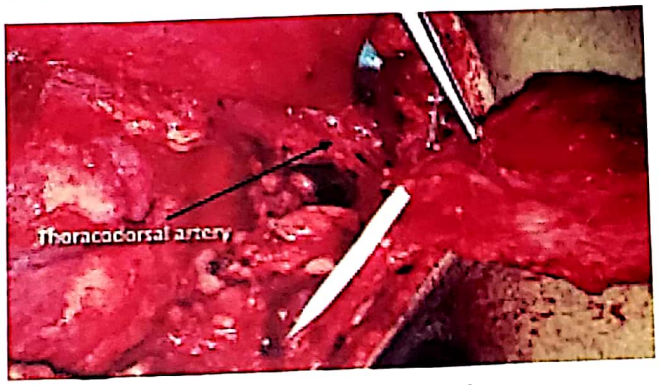

Fig.-1.7: *Dissection of LD free flap pedicle.*

Meticulous postoperative care was maintained by immobilization of lower limb with cast or back slab. Regular flap monitoing was done by observing temperature, turgor, color, capillary refill, dermal pin prick and hand held doppler.

In case of any sign of venous congestion or diminished vascularity some stitches of the wound was removed, leg was elevated and if venous congestion persist then patient was transferred to Operation Theater for immediate exploration. Presence of infection, marginal necrosis, and flap loss was also monitored. Donor site was closed primarily. Negative suction was kept in situ and was inspected regularly for presence of infection and graft loss.

Complications were managed according to the nature of complications. Flap marginal tip necrosis was salvaged by excising the necrosed margin and closure of the wound with flap advancement or split thickness skin graft.

All the patients were advised to come at 4 weeks for 1 month then 2 weekly for next two month for follow up.

Results
All the findings are collected, tabulated and statistically analysed to determine the result of the study.

Table-I

Distribution of the patients according to age (N=30)

Characteristics	ALT Number of patients (%) (n=15)	LD Number of patients (%) (n=15)	Total N=30	P value
Age in years				0.414[NS]
≤15	1(6.7%)	2(13.3%)	3(10%)	
16-20	1(6.7%)	1(6.7%)	3(10%)	
21-30	5(33.3%)	9(60%)	14(46.6%)	
31-40	4(26.7%)	2(13.3%)	6(20%)	
>40	4(26.7%)	2(20%)	6(20%)	
Mean±SD	32.26±10.33	27.40±9.51	30.68±10.54	

NS= Not significant, In this table Chi-square test is used for hypothesis testing

Table-II

Distribution of patient by sex (N = 30)

Sex	ALT Number of patients (%) (n=15)	LD Number of patients (%) (n=15)	TotalN=30	P value
Male	12 (80.0)	11(73.3%)	23(76%)	0.666[N
Female	3(20.0%)	4(26.7%)	7(23%)	

NS= Not significant, Chi square test was used in this table

Table-III

Distribution of the patient according to etiology of injury (N=30)

Etiology	ALT Number of patients (n=15)	LD Number of patients (n=15)	Total 0 N=3	P value
Burn	5(33.3%)	3(20%)	8(26.66%)	0.409^{NS}
Trauma	10(66.7%))	12(80%)	22(73.33%)	

NS= Not significant . Chi square is used for testing hypothesis in this table.

Table-IV

Distribution of the patients by involving limbs (N=30)

LimbInvolvement	ALT Number of patients (n=15)	LD Number of patients (n=15)	P value
Right lower limb	6(40.0%)	8(53.3%)	0.464^{NS}
Left lower limb	9(60.0%)	7(46.7%)	

NS= Not Significant. Chi-square test was used for testing hypothesis in this table

Table-V

Distribution of the patients by site of injury (N=30)

Site of injury	ALT Number of patients (n=15)	LD Number of patients (n=15)	Total	P value
Ankle	11(73.3%)	0	11(36.67%)	0.001^{s}
Leg	3(20.0%)	13(86.7%)	16(53.33%)	
Foot	1(6.7%)	2(13.3%)	3(10%)	

-- significant. Chi-square test was used for hypothesis testing

Table-VI

Distribution of the patients according to dimensions of wound in this study (N=30)

Wound	ALT Range (Mean ± SD) n=15	LD Range (Mean ± SD) n=15	P value
Length of wound (cm)	8-20(11.60±3.24)	14-23(18.26±3.63)	0.001^{s}
Width of wound (cm)	5-10(7.06±1.43)	8-16(11.66±2.89)	0.001^{s}
Area wound (cm^2)	48-240(85.66±48.30)	80-320 (222.06±85.35)	0.001^{s}
Preoperative wound size	54-260(99.40±51.83)	99-360 (266.66±88.51)	0.001^{s}

S= significant. Unpaired t was used for testing hypothesis in this table.. P value Â0.05 is significant.

Table VII

Distribution of the patients according to dimensions of Flaps (N=30)

Flap	ALT(Mean±SD)	LD(Mean±SD)	P value
Length (cm)	9-20 (12.26±2.96)	12-31(22.40±4.70)	0.001[s]
Width (cm)	6-13 (7.93±1.83)	9-16(12.73±2.60)	0.001[s]
Area (cm^2)	54-260(101.13±50.59)	108-496(284.57±99.88)	0.001[s]
Pedicle length(cm)	7-14(10.30±1.99)	8-12 (9.76±1.14)	0.378[ns]

s= significant, ns=not significant. Unpaired t was used for testing hypothesis in this table.

Table VIII

Distribution of the patients by type of vascular anastomosis

Vascular anastomosis	ALT Patient's Number (n=15)	Percentages (%)	LD Number patients(n=15)	Percentages (%)	P value
End to end	13	86.7	10	66.7	1.000[NS]
End to side	2	13.3	5	33.3	

NS= Not significant, Chi-square test was used for hypothesis testing

Table IX

Distribution of the patients by site of Vascular anastomosis (N=30)

Vascular anastomosis		ALT Number of patients (n=15) Percentages (%)	LD Number of patients (n=15) Percentages (%)	Total	P value
Anterior tibial		12(80%)	6(40.0%	18(60%)	0.107[ns]
Posterior tibial		3(20.0%)	2(13.3%)	5(16%)	
popliteal artery	Main	0	2(13.3%)	2(6.66%)	
	Genicular	0	2(13.3%)	2(6.66%)	
Peroneal artery		1(6.7%)	2(13.3%)	3(10%)	
Venous graft requirement		1(6.7%)	2(13.3%	3(10%)	

ns= not significant. Chi-square test was used for hypothesis testing

Table X

Distribution of patients according to time of surgery

	ALT(Mean±SD)	LD(Mean±SD)	P value
Anastomosis time artery (mins)	25-45(32.26±6.21)	18-40(26.266±7.16)	0.001[S]
Anastomosis time vein (mins)	36-50(47.26±7.57)	18-48(25.66±7.31)	0.001[S]
Operation hours (hrs)	5-9(6.56±1.06)	4-6(5.26±0.70)	0.001[S]

S= Significant. Unpaired t test was used for testing hypothesis in this table.

Table XI

Distribution of patients by closure of Donor site (N=30)

	ALT Number of patients(n=15)	LD Number of patients(n=15)	P value
Donor site closure			
STSG	3(20%)	0	0.068[NS]
Primary closure	12(80%)	15(100%)	

NS= not significant. Chi-square test was used for hypothesis testing

Table XII

Distribution of patients by donor site morbidity (N=30)

Donor site morbidity	ALT Number of patients(n=15)	LD Number of patients(n=15)	P value
Infection	1(6.7%)	1(6.7%)	0.245^{NS}
Graft loss	0	0	
Dehiscence	1(6.7%)	1(6.7%)	
Overall Donor Site morbidity	2(13.4%)	2(13.4%)	

NS= Not Significant. Chi-square test was used for hypothesis testing

Table XIII

Distribution of patients by flap related complications (N=30)

	ALT Number of patients(n=15)	LD Number of patients(n=15)	P value
Marginal flap loss*	1(6.66%)	3(26.6%)	0.195^{NS}
Total flap loss *	2(13.3%)	2(13.3%)	0.624^{NS}
Partial Flap loss*	1(6.67%)	1(6.67%)	0.245^{NS}
Subtotal Flap loss*	0	0	0.286^{NS}
Total complication	4(26.6%)	6(40%)	0.456^{NS}
Complete flap survivality	11(73.4%)	9(60%)	0.637^{NS}

NS= Not Significant.Chi-square test was used for hypothesis testing

Table XIV

Distribution of patients by mobility of joints (N=30)

Mobility of joints	ALT Number of patients(n=15)	LD Number of patients(n=15)	P value
Restricted movement	2 (13.33%)	2(13.33%)	0.068^{NS}
No restriction	13(86.66%)	13(86.66%)	

NS= Not Significant. Chi-square test was used for hypothesis testing

Table XV

Distribution of the patient according to hospital stay (N=30)

	ALTDays (Mean±SD)	LDDays (Mean±SD)	P value
Hospital stay	6-20 (10.0±4.89)	21-40 (28.93±4.96)	0.001^{s}
Hospital stay			

s= Significant. Unpaired t test was used for testing hypothesis in this table.

Table XVI

Distribution of patients according to outcome of reconstruction(N=30)

	ALT Number of patients(n=15)	Percentages(%)	LD Number of patients(n=15)	Percentages(%)	P value
Excellent	12	80%	7	46.7%	0.137^{NS}
Satisfactory	1	6.66%	6	40%	
Poor	2	13.3%	2	13.3%	

NS= Not significant. Chi-square test was used for hypothesis testing in this table.

Table XVI

Distribution of the patient by requirements of staged surgery: (N=30)

Requirement of stage surgery	ALT	LD	P value
	Number of patients (n=15) Percentages (%)	Number of patients (n=15) Percentages(%)	
Single Surgery	12(80%)	0(0%)	0.001S
Two or Multiple surgery	3(20%)	15(100%)	

S= significant. Chi-square test was used for hypothesis testing

Table XVII

Overall Comparison between two flap N=30

	ALT n=15	LD n=15	P Value
Age (yrs)	32.26±10.33	27.40±9.51	0.414NS
Wound dimension (cm^2)	54-260 (99.50±51.83)	99-360 (266.66±85.35)	0.001S
Flap dimension(cm^2)	54-260 (101.13±50.59)	108-496 (284.57±99.88)	0.001S
Pedicle length (cm)	10.30±1.99	9.76±1.14	0.378NS
Donor site primary closure (n=15)	12(80%)	15(100%)	0.068NS
Donor site morbidity (n=15)	2(13.4%)	2 (13.4%)	0.245NS
Flap loss (Complete/partial/marginal)	4(26.6%)	6(40%)	0.456NS
Complete flap Survivality (%)	11(73.4%)	9(60%)	0.637NS
Operative time (hr)	6.56±1.06	5.26±0.70	0.001S
Venous anastomosis time (mins)	47.26±7.57	25.66±7.31	0.001S
Second stage surgery	3(20%)	15(100%)	0.001S
Hospital stay(days)	10±4.89	28.93±4.96	0.001S
Excellent outcome (%)	12(80%)	7(46.7%)	0.137NS

NS= Not Significant. S= Significant

Table XIII

Comparison between two flaps

	ALT	LD
Age (yrs)	=	=
Wound dimension (cm^2)	-	+
Flap dimension(cm^2)	-	+
Pedicle length (cm)	+	-
Donor site primary closure (n=15)	-	+
Donor site morbidity(n=15)	=	=
Flap loss (Complete/partial/marginal)	+	-
Complete flap Survivality (%)	+	-
Operative time (hr)	-	+
Second stage surgery	+	-
Hospital stay(days)	+	-
Excellent outcome (%)	+	-

+ means superiority compare to another group
- mean inferiority compare to another group
= equality between two group

Discussion:

Range of issue should be considered while reconstructin lower limb before planning of a reconstructive proced like site of the injury, size of the defect, exposure of bone tendons, vascular status of the limb and requirement padding properties in weight bearing areas etc[42].

In this study two groups of patients, one group covere ALT free flap (n=15) and another group of patients cov by LD free flap (n=15) were analyzed and compared o basis of age, sex, etiology, site of injury, wound dimens flap size, flap related complications, donor site morb mobility of the joints, duration of the operation and ho stay.

Lower limb trauma was more common in younger age g Majority of the study populations were young. Mea group in this study was 30.63±10.54.

Male predominance was observed in this study. Out 30 patients, 23(76%) patients were male and 7(23%) f

were female in this study. Male were more involved in outdoor activities than female, hence they are more susceptible to trauma. Demirtas Y et al.,2009[41] and Tamimy MS et al.,2010[39] study also found lower limb trauma are more common in male population.

While analyzing the actiology of the soft tissue defect in lower limb, it was observed that only two factors trauma and burn; responsible for all thirty cases of soft tissue defect. In 22(73.33%) patients of total study population soft tissue defect was due to trauma. Rest of 8(26.66%) patients soft tissue defect in lower limb was due to burn.

Among all parts of lower extremities leg was the most common site of soft tissue defect in this study. 16 patients had soft tissue defect in leg (53.33%) which was followed by ankle and foot respectively in 11 patients (36.66%) and 3 patients (10% cases).

This study revealed LD free flap (108- 496, 284.57±99 cm^2) had larger flap dimension than ALT free flap (54-260 cm^2,101.13±50.59cm^2). Significantly larger soft tissue defect was covered by LD free flap (226.06±85.35 cm^2) than ALT free flap (85.66±48.30 cm^2).

In LD free flap a large muscle flap with a small elliptical skin paddle was raised with it, which was closed subsequently by primary closure. So wider LD free flap was taken at the same time closing the donor site primarily. All cases of LD free flap (15 cases; 100%) donor site was closed primarily. On contrast ALT flap width more than 8 cm in this study could not be closed primarily. In this study 3 cases (20%) of ALT flap required STSG to cover the donor site defect. Rest of the ALT free flap (12 cases; 80%) donor site was closed primarily. In LD free flap skin pedicle was taken in way so donor site can be closed primarily. Donor site morbidity was equal in both free flap group, 1 cases (13%) in each free flap group.

Venous anastomosis takes longer time than arterial anastomosis. ALT free flap (mean anastomotic time vein 47.26±7.57 min) takes longer time than LD free flap because it takes two veins to anastomosis. In this study mean operating time were more in ALT free flap.

In this study ALT free pedicle length flap (10.3±1.99 cm) is longer than LD free flap pedicle length (9.76±1.14cm). In Tamimy MS et al.,2010[39] study pedicle length of LD free flap was longer than ALT free flap .

Successful outcome of a free flap largely depends on complication rate. In this study complication rate was higher in LD free flap group in compare to ALT free flap. Though total flap loss in both free flap group is equal; 2 cases (13.3%) of complete flap losses was observed in both free flap group. However marginal flap losses were more common in LD free flap group (3 cases; 26.6%) in compare to ALT flap group (1 case, 6.66%). Marginal flap losses are more common in LD free flap group may be due to larger muscle surface with single vascular pedicle and atherosclerotic changes in lower limb vessels. Single vascular pedicle was not always adequate to maintain perfusion in large flap area.

LD free flap group patients required two stage surgeries. In first stage LD muscle was transferred and anastomosed with the recipient vessels and subsequently skin grafted in second stage. Exposed muscle surface was frequently infected and partial graft loss was found on 2 occasions (13%). Whereas ALT free flap if a single stage surgery.

Therefore, Because of two stage surgeries LD free flap patients were needed to stay in hospital for a longer duration. Mean hospital stay for LD free flap is 28.93±4.86 days which was markedly higher than ALT free flap. Mean hospital stay following surgery in case of ALT free flap in this study was 10.0±4.89 days.

In 11 cases (66.7%) of ALT free flap had an excellent outcome whereas only 6 cases (40%) had excellent outcome in case of LD free flap. Poor outcome that means total flap loss was seen in 2 cases (13.3%) of ALT free flap and 2 cases of LD free flap. Satisfactory outcome came out in 2 cases of ALT free flap and 6 cases (40%) of LD free flap.

In summary this study revealed LD free flap had larger (mean 284.57±99 cm^2) flap dimension and therefore soft tissue defects that were covered by LD free flap were significantly larger (P valueÂ0.05) than the wound size covered by ALT free flap (99.50±51.83). Moreover, Larger LD free flap can be raised with donor site closed primarily. In LD free flap group donor sites were closed primarily without STSG in all 15(100%) cases. On contrast in ALT flap group donor site is primarily closed in 12(80%) patients and required STSG in 3(20%) patients.

In addition LD free flap had shorter opeparating hours (5.26±0.7 hrs) than ALT free flap due to comparatively easy anastomotic procedure; single venous anastomosis will be adequate and comparatively easy flap harvesting.

On contrast ALT free flap had longer pedicle length (10.3±1.99 cm) than LD free flap pedicle length (9.76±1.14 cm). In addition ALT free flap group (11 cases;73.4%) is superior to LD free flap (9 cases;60%) group in terms of complete flap survivality, fewer flap related complications (4 cases ; 26.6%).ALT free flap patients required shorter hospital stay (6-20 days) in compare to and LD free flap patients (21-40 days) due to single stage surgery consequently early

mobilization and less economic burden for the patients and government.

On balance this study concluded ALT free flap is a better option for reconstruction of soft tissue defect in lower limb except larger soft tissue defect, where LD free flap is a better option.

Conclusion

ALT free flap is a preferable option for reconstruction of soft tissue defect with exposed bone to LD free flap in terms of complete survivality, adequate pedicle length and hospital stays except coverage of larger soft tissue defect, where LD free flap is better option.

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